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ABSTRACT

Intended to help composition teachers take advantage of current advances in word processing technology, this booklet demonstrates how teachers can create computer lesson files for students that incorporate findings from research on effective writing instruction and allow students to develop, shape, and revise their own writing at the computer monitor. The first section of the booklet presents a brief review of current knowledge about how writing may best be taught and how the computer can be used to teach it. The second part of the booklet explores some assumptions about teaching writing with word processors, and then provides practical suggestions for selecting software, teaching word processing while teaching writing, developing computer/writing lesson files, journal writing on the computer, collaborative writing, and using the computer to search databases for research papers. The appendix includes sample lesson files. (HTH)

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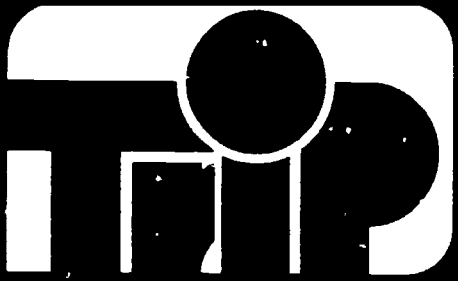

THEORY & RESEARCH INTO PRACTICE

Teaching Writing with a Word Processor, Grades 7–13

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Foreword

The Educational Resources Information Center (ERIC) is a national information system developed by the U.S. Office of Education and now sponsored by the Office of Educational Research and Improvement (OERI). ERIC provides ready access to descriptions of exemplary programs, research and development reports, and related information useful in developing effective educational programs.

Through its network of specialized centers or clearinghouses, each of which is responsible for a particular educational area, ERIC acquires, evaluates, abstracts, and indexes current information and lists that information in its reference publications.

The ERIC system has already made available—through the ERIC Document Reproduction Service—a considerable body of data, including all federally funded research reports since 1956. However, if the findings of educational research are to be used by teachers, much of the data must be translated into an essentially different context. Rather than resting at the point of making research reports easily accessible, OERI has directed the ERIC clearinghouses to commission authorities in various fields to write information analysis papers.

As with all federal educational information efforts, ERIC has as a primary goal bridging the gap between educational theory and classroom practice. One method of achieving that goal is the development by the ERIC Clearinghouse on Reading and Communication Skills (ERIC/RCS) of a series of booklets designed to meet concrete educational needs. Each booklet provides teachers with a review of the best educational theory and research on a limited topic, followed by descriptions of classroom activities that will assist teachers in putting that theory into practice.

The idea is not unique. Several educational journals and many commercial textbooks offer similar aids. The ERIC/RCS booklets are, however, noteworthy in their sharp focus on educational needs and their pairing of sound academic theory with tested classroom practice. And they have been developed in response to the increasing number of requests from teachers to provide this kind of service.

Topics for these booklets are recommended by the ERIC/RCS National Advisory Board. Suggestions for topics are welcomed by the Board and should be directed to the Clearinghouse.

Charles Suhor
Director, ERIC/RCS

Introduction

At a 1985 meeting of the New Mexico Council of Computer Users in Education, the keynote speaker reported, "Programming is the only school subject that teaches students to describe a process, which, if carried out step-by-step, will solve a problem" (Luehrmann 1985). For this reason, the computer is well suited for the writing classroom as writing is a complex problem-solving process. However, for many of us, our introduction to computers meant only programming and usually, the programming of mathematical processes. No wonder the computer struck us as a foreign object. No wonder administrators first placed computers in mathematics classrooms rather than in English classrooms. The speaker above continued his praise of programming, stating, "A programming language gives a person a special way to think about things, express ideas, solve problems."

Those of us who believe in the power of writing as a vehicle for learning know that the claim made above for programming languages may be made even more strongly for writing. And just as with programming languages, so with writing: the steps used to solve a problem vary with the individual. Yet, for some English teachers, computers remain a mystery, a tool that only programmers can understand and use. After having tried to use computers for our own purposes, many of us know that nothing could be further from the truth, especially in English classes.

Sadly for those of us who are convinced that the computer offers a means to change education for the better, the computer has not yet made a great impact upon the curriculum. True, teachers and schools believe that something about the computer is worthwhile, but the computer still serves primarily as a supplement to what is being done in the classroom rather than as a tool to improve student learning or to alter the teaching environment. The reasons are several. First, textbooks tend to mold the curriculum and textbook publishers have been reluctant to respond to the challenge of the computer. The publishers fear a volatile market, one that sees promising computer companies fold when that market does not result in large sales of their products. Publishers are hesitant to spend large amounts of money to develop new computer programs when they

know that current computer programs will be shortly superceded by more powerful and better programs. They do not know which computers to design their programs for, and they simply are afraid to compromise their main money-maker—the textbook—with an unknown product—the computer disk.

Second, many teachers have been discouraged by the quality of computer programs that they have seen, many of which are monotonous drill and practice programs whether clothed in the guise of games or not. The drill and practice programs do not match what we know about learning to write and typically reinforce low-level skills that could just as easily and much more inexpensively be recreated in workbooks or on ditto sheets. Even the pedagogically sound interactive programs designed by college English professors (Burns 1980; Rodrigues and Rodrigues 1984; Schwartz 1983; Schwartz 1985; Wresch 1984) have occasionally disappointed teachers who expected more powerful and recursive programs. Because these programs have been written in the programming language BASIC, they cannot allow writers to move freely from one stage of writing to another. Instead, the program locks the writer into a preprogrammed process.

With the limited budgets of most schools and universities, teachers have become reluctant to purchase new programs until either the programs improve substantially or their budgets magically increase. But, in dismissing ineffective or disappointing educational software, curriculum developers and department heads have ignored the greatest potential of the computer: the potential to use programs regularly used in the workplace, such as data bases, spreadsheets, communications software, and, the most valuable to English teachers, the word processor. These tools can form the basis for the computer-oriented curriculum, and, through word processing, make computer writing an integral, valuable part of our curriculum.

Marc Tucker (1985), in a speech before the Association of American Publishers, pointed out that most university professors do not use software to provide instruction for their students. Rather, they use computer software as a tool for students to work with. With this view of computers, English teachers can tailor their word processing files for the students and can make the word processor the central computer software in their curricula. Think of it! Instead of spending $39.95 or $139.95 for a program that may have severe limitations, a program that you and your students might abandon after only a few uses, you can create lesson file disks for only the cost of the disk and the time it takes you to create them.

Our intent in this booklet is to demonstrate how you can use a word processor as your central software package and how you can create lesson files for students so that you can teach writing in ways that research has indicated to be valid. We will begin with a brief review of current knowledge about how writing may best be taught and how the computer can be used to teach it.

1 Theory and Research

Teaching Composition

For the last decade and a half, the theoretical investigations into the nature of the writing process by researchers such as Janet Emig, Mina Shaughnessy, Nancy Sommers, Linda Flower, John Hayes, Sondra Perl, and others have been complemented by pedagogical developments by teachers such as Donald Murray, Ken Macrorie, Donald Graves, Peter Elbow, and many others. We are teaching at a time when theory has a strong influence over practice and when researchers are refining their questions and techniques to provide us with greater insights into the process of teaching.

Some theorists, such as George Hillocks (1986), question what is acceptable as the final word in an ever-changing text of knowledge. However, there is agreement on a number of points:

1. Writing can be taught—it is not something that develops instinctively.
2. We can identify and share effective teaching strategies.
3. Effective teaching strategies tend to be based upon a fluid notion of writing processes.
4. Central to that notion is the idea that writing is a gradual movement toward form—that if one concentrates upon the final product too soon, one is less able to improve the writing.
5. Teachers can best influence student writing by commenting on drafts in process rather than by marking finished products. Teachers' comments on early drafts should be limited to content and organization. Comments on surface features (spelling, usage, punctuation, sentence structure) should be reserved for almost-completed student drafts.
6. Discovering what the student intends to say and developing those ideas is primary. Only after students develop fluency will they have written enough to make revising effective and meaningful.
7. Writing processes are recursive. Prewriting and invention—the discovery of ideas and form--need to continue throughout the process

of writing toward an end product. Even while creating a first draft, writers will edit. Even while editing, writers may discover new insights and need to revise again.

8. Teachers cannot tell students about writing processes and expect them to write accordingly. They must demonstrate those processes through a variety of ways—writing workshops, peer review sessions, brainstorming—and always with students writing.
9. Teaching writing well may require much classroom time and, as a result, limit the number of final drafts a student submits. Yet the number of writing acts a student experiences—prewriting, writing drafts, responding to writing, revising, editing—will increase.
10. There is no one right way to teach the processes of writing. There are, however, desirable and undesirable ways.

In general, though much has been learned about how writers write, not enough has been learned about how teachers can best teach writing, especially under classroom conditions that more often than not inhibit—or even prohibit—methods that a teacher would like to use. It is one thing to tell students to follow a process approach to writing, another to show them how to write recursively, and still another to succeed in getting them to follow that guidance. At the 1985 Conference on College Composition and Communication Winter Workshop, Sondra Perl discussed ways of trying to get writers to monitor and change their writing processes, stressing students' reluctance to alter their ways of writing. Adding the variable of writing on the microcomputer to our observations of writers-in-process opens up a whole new world of questions.

George Hillocks (1986) has noted that the so-called process approach is not enough. His meta-analysis of research studies indicated that environmental techniques (providing students with situational contexts for their writing) produced five times more effective results than the presentational approach (in which teachers simply tell students how to write) and three and one-half times better results than process techniques alone. He concluded that "hybrid" techniques, combining such methods as modeling, contexts for writing, process approaches, and others, appear to be most effective. For example, as a culminating project for the year, a class might decide to produce a booklet telling other students how to find summer jobs. Not only do they need to write their ideas, but also they need to consider such realities of writing as what readers will truly want and need to know, what format will work best, and how the booklet can be most effectively designed and printed. Thus, the writing context becomes a real-world context.

As researchers continue to search for effective ways to teach writing, they are examining such areas as the social contexts for language learning (e.g., Odell and Goswami 1982), the differences between children's and adults' language production (e.g., Langer in press), and the importance that a student's knowledge of the topic has upon that student's ability to write about that topic (e.g., Bereiter and Scardamalia 1982). Such avenues of research only serve to reinforce our notion of how complex writing truly is.

Research on Using Word Processing

Across the country, many teachers are beginning to incorporate word processing into their writing classes. Administrators are watching closely, mindful of the expense involved, while external pressure groups, such as politicians, expect dramatic results and miraculous growth in writing ability. Writing teachers need to explain that the results might not become evident for a long time—possibly not until elementary students who are beginning to write with computers reach high school. Quite simply, the word processor cannot be expected to work wonders overnight. The writers' abilities and writing strategies, acquired before using the word processor, will influence the effect the computer has on their development as writers. For instance, students who have not learned to contemplate their writing before they begin and who have not been trained to revise effectively will not improve merely because they have an opportunity to write with a word processor. Teaching strategies also affect research results. Specifically, until teachers learn the best ways of teaching with word processors, student writing may not improve significantly in quality.

Long-Range vs. Short-Range Results

In the first reported study to employ computer technology to record students' writing (reported in Bridwell and Duin 1985), researchers at the University of Minnesota observed graduate students with extensive writing experience who were just beginning to write with a word processor. The researchers used a program that recorded student keystrokes—including backspacing, deleting, and block moves—and that recreated the actual creation of text for both writer and researcher to observe and analyze. The researchers divided these students into two groups: "Beethovians," those who discover what they want to say as they write, and "Mozartians," those who plan rather thoroughly before attempting a draft. The Mozartians reported that the word processor tended to facilitate their

writing. On the other hand, the Beethovians felt frustrated by having to scroll back and forth to see what they had written. All reported that they could not break completely free of paper. Those were the immediate, short-range results. However, one long-range result was that all but one of the students soon purchased a microcomputer with a word processing program (Bridwell, Nancarrow, and Ross 1984).

These preliminary results are revealing. The researchers discovered that prewriting was important, but that it did not always occur before the writers began to write the first draft. Pauses seemed to be long, but they occurred at points where the writers wanted to reread major chunks of ideas. Most important, the researchers concluded that these experienced writers had no single method of solving writing problems. Thus, while their attitudes toward writing with a computer may have varied, their success as writers was not based upon whether their writing strategies with the microcomputer varied.

Bridwell and Duin's (1985, 115–21) general conclusion about research at the University of Minnesota applies to most research to date: "The effects of the computer interact with the students' sense of the task, their success in learning the particular word processing system, and their individual writing abilities." Lawlor (1982) also maintained that later improvements in student writing may clearly be predicated upon those students having worked earlier with the word processor. Thus, the positive as well as the negative effects of using computers may be influenced by the entire writing situation. As we read the current research about writing on the computer, we must continue to ask ourselves what the results will be like once the students are comfortable with word processing and are experienced with it.

Effects upon Revision

Jones, Meis, and Bolchazy (1985) observed secondary students working on the Bank Street Writer word processing program for approximately one month. The students had one major assignment—to produce an extended memoir, one that included narration, dialogue, and descriptive detail, as well as an introduction, at least three main events, and a conclusion. Students wrote about such topics as building a fort in the backyard or going to summer camp. These teachers and researchers found that students working with the word processor made fewer revisions than students working with paper and pen. In fact, those who worked with paper and pen included *three times* as much specific detail as those who worked on the word processor and made almost three times as many mechanical revisions as those who worked on the word processor.

On the surface of these statistically significant findings, it would appear that using a word processor actually works against student writers. Yet the pertinent observations of Jones, Meis, and Bolchazy concluded otherwise. They felt that the odds may have been stacked against the word processing group because this was the first time that the students had used a word processor and because they also had to learn word processing while learning the writing task. Moreover, regardless of the results of the study, the classroom teacher reported that students working with the word processor were eager to begin work each day, were entranced by the words on the screen, and were enthusiastic about their work. In addition, they asked questions about their task continually, wanted to see each other's drafts in hard copy, and felt that having to work in pairs because there were not enough computers for everyone was "marvelous." The teacher's enthusiasm for continuing to work with the word processor is convincing.

In the above study, the research team considered instances of revision as more important—and rightly so—than creating the original draft. But with the word processor used in this study (the early version of the Bank Street Writer), revision is not as easy as it is with many word processors, pointing up the fact that teachers need to consider carefully the features of the word processing program itself. The program chosen for this study required that students stop the writing mode and enter an editing mode to revise. Thus, the word processor itself worked against easy revision, revision that might occur while the writer is composing, revision that is part of the recursive nature of writing. Despite this difficulty, the research team reported that student attitudes toward revision were positive, thereby offsetting some of the negative findings about the quantity of revision.

Positive student attitudes toward revising with a word processor seem to be common. Yet, in examining the revision of a group of advanced university students using a word processor, Jeanette Harris concluded that "word processing does not, in and of itself, encourage student writers to revise more extensively, especially the macrostructure of a text" and that "we should hesitate to assume that word processing programs can teach writing" (Harris 1985). Her conclusions appear to parallel those of Collier (1983), who, in fact, only had students create final drafts on the computer. Harris's students also appear not to have originally composed with the word processor. While these studies caution teachers not to be overly enthusiastic about the effects of word processing on revising, they also exemplify how difficult it is to judge those effects when only part of the students' writing takes place with a word processor. Ronald Sudol (1985), whose students composed on word processors throughout their

writing, agrees with Harris that students and teachers must use hard copy printouts to learn to revise effectively, but he also stresses that "word processing does not teach writing. . . . Our concern should not be computer applications to *writing* but computer applications to *writers.*" Student writers must be helped to see revision as organic to their writing processes, and that is most effectively accomplished when the instructor is fully present—teaching methods that the word processor enhances, coaching, and observing the revision in progress.

In describing long-term effects of computers on writing and revising, Gail Womble (1985) reported that the tenth-grade students she worked with tended to revise only at the surface level—but that surface revisions gave way to more important revision strategies once the students became comfortable with their word processing system. Since other writers have reported that students do revise more and at a higher level when writing with a word processor (Bean 1983; Monahan 1982), it appears that students' abilities to revise well are clearly tied not to whether they use a word processor *per se,* but whether they use it fully in their writing and what the role of the writing instructor has been in teaching them to write with the word processor.

Changes in Attitudes toward Writing

Researchers and practitioners alike seem to focus upon the importance of noting student attitudes toward writing with word processors. Some (Lindemann and Willert 1985; Daiute 1984; Hull 1984) point out such positive effects on students as greater willingness to revise, greater willingness to try such prewriting techniques as freewriting, greater pride in their work, greater willingness to experiment with words and formats, and greater attention to teacher and peer comments.

Other reports do not view changes in attitude as being all positive. Some trace negative attitudes to mechanical and classroom management problems. Lindemann and Willert (1985) were concerned about the lack of privacy for some students, the need for keyboarding skills, the lack of equipment, the occasional loss of files students had written, and the difficulty of dealing with many questions at once. Zimmer (1985) characterized these constraints as resulting in "chaotic traffic jams, disgruntled students, and harried teachers." She stressed the need for creative scheduling. Selfe (1985), reporting on university students, included such problems as time limits for students to work on the computers, eyestrain, backaches, and what she called "burnout." Although a number of her students liked word processing, others felt that the computer removed them from the physical contact of pen against paper. They could not draw circles and arrows and diagrams. Herrmann (1985), after working a short time

with volunteer high school students trying to write with the older version of Bank Street Writer, concluded that students who felt negative about their writing in the first place tended to resist learning word processing. Appropriately, Gifford and Dean (1985) caution that teachers should not expect the first time teaching with a word processor to be easier than teaching without one. While instructors may have to spend more time initially developing the word processing classroom, the time is actually spent learning to use the word processor as a teaching tool, to deal with system problems when they occur, and to develop appropriate lessons. Having stated that, they remain positive about the progress their word processing students made.

While admitting that classroom management problems and both hardware and software complications are very real, other writers seem to counter the criticisms noted above. Both Rodrigues (1985) and Arkin and Gallagher (1985), who worked with basic writers at the university level, reported that their students revised more readily, increased their attention spans, learned to enjoy writing more, became more aware of their own textual deficiencies, and became more fluent. Moreover, as Hull (1985) argues, the difference between working with a word processor or not may be crucial to the improvement of these students' abilities to present evidence, argue a position, convey information, and be coherent, convincing, and correct. After having worked with adult students, Carlson (1983) noted their greater appreciation for style, and Schwartz (1982) was clearly enthusiastic about how much less defensive about criticism they became while also becoming more objective about their need to revise.

Changes in Writing Processes

This concern about students' attitudes toward writing with a computer may clearly be tied to another focus of researchers and writers—the emerging evidence that, as students learn to write with a computer, their writing procedures change. The added implication is that as students change their writing procedures, so teachers must adjust the ways they teach writing. For example, Daiute (1984) observed that junior high school students tended to produce more garbage in their first drafts when they used a word processor because they knew that revision would be easier. Wresch (1984) remarked how seventh graders, after three months of writing with a computer, employed more task-related talk and approached prewriting tasks independently. Such task-related talk was apparent to Kurth and Stromberg (1984), who, after working with middle school and junior high remedial writers, noted that students in the computer-writing classes tended to spend more time dicussing their writing than students in the control groups. They argue that the presence of

the computer screen seemed to facilitate the talk and to focus attention on the students' writing.

The research clearly emphasizes the idiosyncratic nature of writers, whether working on a word processor or not. True, Bridwell, Ross, and Nancarrow (1984) indicate that some of their Ph.D. candidate subjects could not write as readily with the computer as they could with paper and pen—they still had to plan on paper before attempting to compose on the word processor—but they did revise more. These students admitted that they tended to want to tinker with minor matters, and so they had to force themselves to move along. Selfe (1985) reported a number of individual strategies she observed students using. One typed a list of vocabulary words at the bottom of his file and a list of key sentences or concepts at the top, and then, as he wrote, moved either to the bottom or the top of his file to gather ideas. Another wrote passages in separate files, using capital letters to type topic sentences in each, and later brought them together electronically. Not all students, however, are daring and innovative enough to discover useful ways to write with the computer. Teachers need to collect, refine, and share these computer-writing strategies with their students. After all, when students write with word processors, teachers are teaching not just writing processes but computer-writing processes.

Selfe suggested developing varied teaching strategies, such as encouraging students to use large block moves experimentally to seek different rhetorical strategies; using search-and-replace commands to try different points of view; double- or triple-spacing hard copy for easier revision and editing; and experimenting with different formatting commands and font types for different rhetorical purposes. It may be that while Gutenberg opened a new world with his printing press, the typeset page as we know it has remained more sterile than it need be. One notable exception is the cartoon strip *Pogo* by Walt Kelly, in which the words of Sarcophagus Macabre and P.T. Bridgeport are represented by a wide variety of letter styles, depending upon what the characters intend to convey. The microcomputer equipped with a variety of formatting commands and font types may well liberate the printed page.

Some Interim Conclusions

While the number of research studies is limited, some preliminary conclusions can be made. First, once students have mastered word processing, the word processor appears to facilitate writing. Second, when students learn word processing, their attitudes toward having to write appear to improve. Third, how students are taught to write with a word processor

must be different from how they are taught to write without a word processor. The social context of writing with a word processor, in which individual writing is displayed for all around to see, necessarily forces teachers to consider new classroom approaches. However, many successful techniques for teaching students to write with paper and pen can be adapted for the word processor. And fourth, the computer-writing environment puts different constraints upon both teachers and students. For example, technological considerations mean that the teachers ought not to expect teaching with a word processor for the first time to be easier than teaching without it. In fact, it will probably be more difficult, although the long-term gains may far outweigh the initial complications.

The technology is here. Adapting it successfully to the classroom will depend upon teachers. The integration of word processing into writing curricula requires much more research and many more classroom experiments.

2 Practice

Assumptions about Teaching Writing with Word Processors

After considering the researchers' reports and after experimenting with a variety of teaching strategies in our own classrooms, we have developed some assumptions about teaching writing with word processors. We have organized this section around those assumptions:

1. *To teach writing with a word processor most effectively, you must, above all, be comfortable with the tool yourself, writing regularly with it.* You will then be able to present it to students as a powerful writing tool, not just as a more advanced electric typewriter. You will be able to understand the role the computer can play in your classroom, to select appropriate word processing programs and supplementary programs for your students, and to help students learn how to write with the word processor while you continue to teach writing.
2. *You can assume that your computer-writing classroom will be different from your traditional classroom.* When you first begin to use word processing in your writing classes, you should not be discouraged if the initial complexity actually slows down your students and makes your work more difficult. Later, as your students become more comfortable with the tool, their fluency and writing skills will increase. To help manage your classroom, you might want to consider developing some specialized teaching strategies for your new situation. We will suggest one strategy: create computer-writing "lesson files" that students can use independently when you are not able to give them as much individual help as you would like.
3. *You will be able to adapt some of the ways you currently teach writing to the capabilities of the tool, just as writers who work regularly with a word processor adapt the ways they write to both the power and limitations of the tool.* Of course, even though you will be able to adapt to the word processor many of the ways you currently teach writing and profit from that adaptation, the power of the word processor will compel you to teach writing in new ways.

You can expect to interact with students more effectively and marvel at the techniques that the students themselves discover, techniques that will range from the purely idiosyncratic to those that are applicable for all writers.

Part One: Preparing to Teach Writing with a Word Processor

The Role of Word Processing in a Writing Classroom

The word processor can enable you to demonstrate both the fluidity and the tentativeness of language better than you have ever been able to do with overhead transparencies or dittoed handouts. With a large screen monitor or a video data projector, you can demonstrate to a class how a draft can grow and change in the process. You can type in a complete paragraph, for example, and try it in one part of a composition or another, reading it for stylistic and rhetorical effect in more than one position. Such a demonstration not only illustrates how easy it is to make changes, but also how painless it is to erase the words and start over.

If you would ask your colleagues who use the word processor differently than you do also to demonstrate their writing strategies to your students, students could appreciate the necessity of finding their own "writing processes." Students could watch as a teacher searched for the exact word, typed it in, observed it in context, listened to how it sounded, and perhaps even moved it from one part of a sentence to another.

With enough computers in your classroom, you can use word processing at any time. For most of us, however, that situation remains a luxury. At best, we may be able to use a computer laboratory only once a week. In that case, we will need to decide which writing activities can be done without the word processor. Students can, if necessary, write their initial drafts without the computer and then enter their text and revise—a much more complex task—on the computer. However, unless we teach students how to revise, many will simply use the computer as an electric typewriter and enter drafts with only the most superficial revision. Students can also do their proofreading—correcting mechanical problems, such as spelling and punctuation or minor sentence problems—on hard copy and make their corrections on disk whenever they have access to the word processor. Pedagogical judgments such as these can be made well by a teacher experienced in teaching writing as a process.

If your classroom is equipped with enough computers for all or even for a portion of your class, you can encourage more collaboration during the writing process than when students write with pencil and paper. With

computers set up around the periphery of the classroom, you can quickly move to any student to offer advice or assistance. Other writers can see what you are doing and can frequently be asked to comment on one another's papers, using the same techniques they have observed you using. Occasionally, you can stop the class, project a student's writing at any stage, and ask for comments from other students or point out how well a particular draft may be developing.

If your students have access to word processing software during the day or evening, but not during your classes, you will need to determine effective ways to influence your students' writing behavior when you are not present. You can ask students to keep journal entries in which they record the ways they use the word processor to draft and revise their essays. You can design special writing assignments for students to complete at the computer: revising activities, asking students to add, delete, and rearrange text in sample paragraphs; editing activities, requiring students to trade disks and find grammatical and mechanical errors in one another's files; and drafting activities, requesting students to print copies of their writing at selected times during the drafting process, which in effect illustrates on paper how they compose at the monitor.

With computers, your role as a writing teacher will change; more than ever, you will need to make decisions that affect students as writers. For instance, you may want to recommend changes in the ways writing currently is taught. Considering the time required for composing at the computer monitor—time for writing and thinking, time for seeking sources of information—teachers may argue that English classes need to be longer than the traditional fifty-minute period. You might recommend that classes last half a day, but only meet twice a week. You might want students to turn in disks, not papers, so you can enter into the process of creating a draft more readily. You might require students to send their files via modem (a device which changes computer signals into telephone signals and vice versa) to students in another school for peer review. You might even consider the value of joint authorship by students, a common practice in the business world. Such changes are limited only by computer availability, pedagogical will, and administrative constraints.

Selecting a Word Processing Program

As more advanced uses are developed for word processing in secondary and college courses, the characteristics of the word processing program become more and more critical. This section is intended not to promote any particular program, but to describe those characteristics we have come to value.

First, what you see on the screen should be exactly—or almost exactly—what you receive from a printout. Complex formatting commands required to print a file the way you want it only interfere with writing. Furthermore, at times writers organize material on the page for purely aesthetic reasons, as well as rhetorical reasons, so seeing what they will get can only help the creative process.

Second, the number of keystroke commands needed to move from one mode of writing to another or to execute a particular operation should be minimal. For example, a writer should be able to move from writing to editing and back with as little mental interference as possible.

Third, a program should have the potential to do many things, such as create subscripts and superscripts or print different typefaces (or at least produce boldface and underlining). Some students may appreciate a program that can generate an index or one that can print footnotes and bibliographies in standard formats. While the initial commands required to write and print a short writing assignment should be easily learned, a simple program that has limited capabilities may frustrate students in the long run. A more complex program may ultimately be more valuable to students and to teachers.

Fourth, a number of characteristics are desirable, though not essential at first. Windows, the ability to superimpose one screen upon another, allow writers to look at more than one type of data at once. For example, while writing, a student may want to look at a rough outline or a brainstorming list. Or, while revising, the writer might want to consult peer comments. Telecommunications capability, the ability to use a modem to talk to other computers over telephone lines, opens up vast sources of data and publishing. The possibility of integrating data bases and spreadsheets, as well as graphics programs, with the word processor allows the writer to move from one source of data to another easily and quickly. Interchangeability of files from different word processors allows students to write at school and at home, on different machines, thereby increasing the potential of computer writing in school. (While most computer files cannot be used with a computer or a word processing program other than the type they were created on, one way of transferring such files—when your school has the capability—is to send the files through a communications program via modem from one computer to another. As long as the programs use ASCII* characters, the files will be interchangeable. Granted, this seems like a complex procedure for what should be a simple operation, but it works.)

*American National Standard Code for Information Interchange

Finally, more experienced computer-writers will have certain characteristics that they want from a word processor. For example, does the writer name a file before or after writing it? Can a portion of writing be transferred from one file to another without losing data? Will the word processing program automatically indicate how much space is left on a disk? Can the writer shift print formats within a file? Word processing programs which include advanced features often require more memory than most computers include. If you want a program with a lot of extras, you may need to purchase memory boards to extend your computer's capacity.

Decisions about what supplementary programs to use will also need to be made. Teachers need to consider whether style-analysis programs and spelling checkers will ultimately do the student writer more long-term harm than good. The most commonly noted supplement to the word processor is the spelling checker that accompanies many word processing programs. However, because microcomputers do not really understand what the student has written, the spelling checker may not catch homophone errors. For instance, the computer will not know which of the following is correct: "He is a good sailer" or "He is a good sailor"; "Word processing has become a rite" or "Word processing has become a right." Allowing a spelling checker to become a spelling corrector may be a major mistake since the spelling checker does basically what most teachers do: it notes possible spelling errors, but does not correct them. The fact that it simply notes possible spelling errors and does not correct them means that the student must still be the judge of whether to correct the word or not. As long as students retain control, and as long as spelling checkers are accurate, they may help at least some writers. Only by using them in the classroom will teachers begin to evaluate their full effectiveness.

More controversial than spelling checkers are the so-called style-analysis programs (such as Homer, Grammatik, and Writer's Workbench) which identify potential problems in such matters as diction, usage, and agreement (Dobrin 1985). Because students may be misled into thinking that correcting a sentence according to the computer's advice automatically leads to a superior sentence, these programs need to be used judiciously. The authority of the computer to influence a writer needs to be balanced by a writer's growing sense of control over his or her writing. Teachers need to interpret results and guide students in ways of working with style-analysis tools.

Teaching Word Processing while Teaching Writing

After you select the word processing program and any supplementary programs you want to use with your students, you need to decide how to

introduce students to the computer tools without taking too much time away from your English course. We feel that, if possible, English teachers rather than business departments or computer centers should introduce students to word processing software. Students only need to know the basics of word processing in order to begin writing with a word processor —not all the technical features taught by someone divorced from the context of learning to write. Students in English class must compose drafts, not merely type them. Many English teachers have found that business departments don't object to their training students in computer writing, but they do object to English teachers' training students to do word processing. To write is not to do "word processing."

In order to encourage the development of students' computer-writing skills—not just their knowledge of word processing commands—you may want to coordinate their writing assignments with the gradual introduction of word processing strategies.

After students become proficient in some preliminary word processing skills (entering, deleting, saving, and printing text), you can introduce more sophisticated commands for erasing, moving, and copying portions of writing. By revising a sample of a student's or your own rough draft in front of the entire class, you can show how the more advanced word processing commands are useful for revision. As a rule, you should probably not introduce a new word processing command or function until students have a need to use it in their own writing. For instance, if a student has misspelled a word consistently throughout a paper, you might want to demonstrate how the "search-and-replace" feature of a word processor can be used to correct the errors efficiently.

We believe in introducing word processing gradually. For instance, you might decide to present selected word processing skills along with each of the first few assignments of your course. If you begin with narrative essays, you could focus only on teaching students how to enter, delete, save, and print their writing. To avoid overloading your students with information about computers, you might even want to load and save their files yourself for the first few days. Then, when students are assured that they can easily learn how to write with computers, you can introduce them to computer commands for saving and printing. When you move to the next assignment, perhaps a descriptive essay, you might show students how to use the block move and the block copy commands of their word processors. On the third assignment, you could help students learn how to use such features as underlining, producing boldface, creating footnotes with the superscript capability, or using the search-and-replace features.

As we have mentioned in the research section, many teachers have thought that word processors themselves would have a magical effect on

students' revising practices. Because it is possible to revise instantly and make endless changes in a draft, teachers and researchers had expected students to experiment more with their writing when they used word processors. But novice writers see little reason for revision, as Bridwell (1980) and Sommers (1980) discovered previously. Unless taught to do more, most students revise only for surface errors—with or without computers.

Researchers at Bank Street College of Education were among those who had expected students to do more revising with the computer than they did before they used it. When they found that students were only using the Bank Street Writer as if it were a powerful typewriter, merely correcting errors with it rather than revising significantly, the researchers redesigned the software to make it easier for students to move from writing to revising and they helped the teachers learn how to present revising strategies to their students. With instruction, and with a more fluid word processor, researchers found that students did indeed make noticeable changes in their writing (Kurland 1984).

Even students who already know how to use a word processor need a teacher's guidance in learning word processing techniques useful for writing. Your *experienced* word processing students might be adept in using computer commands to type their writing, but they may not have developed independent strategies to help them write recursively. These students may never have considered experimenting by moving paragraphs or sentences around for better organization and coherence. They might not have considered saving portions of their writing in "idea files" to use later in a paper. They may not have considered the value of first creating an outline for their book report, and then writing the individual parts, in any order, in the appropriate spaces. If English teachers suggest these and other strategies as students have a need for them, then students will begin to try more computer commands, discovering their own ways to use the word processor as a writing tool.

Part Two: Using New Techniques in the Word Processing Classroom

Computer-Writing Lesson Files

While it is probably true that the best way for a teacher to help a student to write is to interact with the student while the writing is developing and to encourage students to interact with each other, often the teacher simply does not have the time or the computer facilities to be present while all students are writing. One way to influence students' development as

computer-writers—even when you are unable to be present—is to create computer "lesson files."

A computer lesson file is a set of directions typed with a word processor and saved in a special file that the student can load and use as a guide. The underlying purpose of using lesson files with students is to help them learn how to develop, shape, and revise their own writing at the computer monitor. Therefore, although lesson files are no substitute for a teacher, they can be valuable adjuncts to the writing classroom for the following reasons:

1. They are more flexible than most computer programs for writing because a student typically cannot move to any point in such programs at will.
2. When the teacher cannot be present, such as when the students are in a computer laboratory without the teacher, students can follow the lesson files on their own, whether the techniques were originally presented by the teacher or not.
3. Sometimes students may want to experiment with writing techniques that have not been presented in class. In this case, the computer lesson files can serve as a bank of ideas and approaches.
4. The teacher may want students to review writing techniques on their own, before attempting to write freely at the word processor.
5. When the teacher is working with one group of students, another group of students could be introduced to a new writing technique by working through the lesson files before the teacher explains the ideas.

Sample Lesson File: Paragraph Development

If you want to encourage students to develop their ideas fully, in separate paragraphs with details, instead of running general ideas together in long, undeveloped passages, you have many options. One technique would be to give them an exercise on paper, in which you explain what a well-developed paragraph looks like and in which you ask them to complete several underdeveloped paragraphs. Another possibility would be to create a computer lesson file in which you ask students to read through a sample of student writing and then direct them to find places where the writer shifts to new ideas without developing previous ones. By telling students to press RETURN two times whenever the student writer has shifted directions, you could give the students immediate experience in using the word processor to detect paragraph weaknesses and to revise by adding details. Here is a sample of a lesson file that we created for this purpose:

****

1. REVISING EXERCISE: DEVELOPING PARAGRAPHS

Read through the following example of a student's rough draft of a narrative theme. Then follow the directions which are included after the sample. (The student has written only one paragraph, even though the assignment was to write a theme.)

High School Prom Trouble

One Monday afternoon, I was called out of my math class and was told to report to the front office. As I walked out, I knew for some reason what getting in to trouble was going to be like. On the weekend before I was called to help my Jr. class decorate for our Jr. and SR. Prom. I was assigned to paint cardboard so it would look like trees. As I started to work on it, we all started to mess around. At that time something got in my mind and I started to paint the real trees. I remember my friends telling me to stop, but I didn't listen. On Monday afternoon when I was called out of class to the office, I had a certain feeling I was in a little trouble. When I sat down in the office, the principal started to ask me some questions. He was surprised and upset with me. He gave me my penalty, a 3 day suspension, and called it vandalism on school grounds. On the way home, I was wondering how my parents were going to react. They, also, were disappointed at me and I got grounded. When I returned back to school on Thursday, I felt weird.

PLEASE CONTINUE WITH THIS EXERCISE.

****

****

2.

In a moment, you will be asked to go back to the sample paragraph in the above frame. When you do so, follow these directions:

A. Create a new paragraph wherever you think the writer shifts to a new idea. To do this, move your cursor to what will become the first word of this new paragraph and press RETURN twice.

B. Go back to each new "paragraph" you have created and add some details or ideas that you think the writer might be able to use in his narrative. Type your sentences right after the original ones so that you can see what the paragraph looks like when it is more developed.

Please revise the student sample in frame #1 now.

AFTER YOU HAVE REVISED THE PASSAGE IN FRAME #1, PLEASE CONTINUE WITH THIS EXERCISE.

****

****

3.

Trade computers with a classmate and see how your partner has completed this exercise. When you return to your own computer, you may have some more ideas you could add to paragraphs in the student sample. If you want, you can go back to frame #1 and make any changes you would like to make.

WHEN YOU ARE READY, PLEASE MOVE TO THE NEXT FRAME.

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**********************************************************

4.

Use the technique presented in frame #2 when you
review your own writing. Just press RETURN
whenever you find that you have moved on to a
new idea without completely developing the
previous one. Then develop each new paragraph
fully.

Save your file so that you can print a hard copy
of your response to this exercise.

                    SAVE YOUR FILE NOW.

**********END OF LESSON**********
```

Student Response

Here is a sample of one student's response to the above lesson. Because the point of the lesson was to encourage students to revise for content (by adding details) and organization (by determining paragraph boundaries), the student was not expected to correct errors. Although the paragraphs are still not well developed, the passage is much more effective than the original and the student has had experience using the word processor for early revision. Instead of recopying the entire paragraph by hand in order to revise for these features, the student only had to add the parts that needed to be added. (Subsequent exercises could be devised to focus the student's attention on finer points, but the purpose of this exercise is to encourage students to get content and organization under control early in the drafting process using a technique that they could use themselves when writing independently.)

First, the student followed directions, pressing RETURN when the writer shifted gears:

```
                    High School Prom Trouble

One Monday afternoon, I was called out of my
math class and was told to report to the front
office. As I walked out, I knew for some reason
what getting in to trouble was going to be like.

On the weekend before I was called to help my
Jr. class decorate for our Jr. and SR. Prom. I
```

was assigned to paint cardboard so it would look like trees. As I started to work on it, we all started to mess around. At that time something got in my mind and I started to paint the real trees. I remember my friends telling me to stop, but I didn't listen.

On Monday afternoon when I was called out of class to the office, I had a certain feeling I was in a little trouble. When I sat down in the office, the principal started to ask me some questions. He was surprised and upset with me. He gave me my penalty, a 3 day suspension, and called it vandalism on school grounds.

On the way home, I was wondering how my parents were going to react.

They, also, were disappointed at me and I got grounded. When I returned back to school on Thursday, I felt weird.

Next, the student added details by moving the cursor to the end of paragraphs and typing in the new ideas. In one instance (the next to the last paragraph) the student added a sentence *before* the newly created paragraph:

High School Prom Trouble

One Monday afternoon, I was called out of my math class and was told to report to the front office. As I walked out, I knew for some reason what getting in to trouble was going to be like.

On the weekend before I was called to help my Jr. class decorate for our Jr. and SR. Prom. The theme for the Prom was "Somewhere in a Misty Forest, and with a theme like that you can imagine what kind of decorations we were supposed to make. I was assigned to paint cardboard so that it would look like trees. Student on the prom committee gave me black and brown paint and told me to meet the others outside on the patio. When I got outside I found the cardboard and started to work on it.

As I continued painting, we all started to mess around. At that time something got in my mind and I started to paint the real trees. I remember my friends telling me to stop, but I didn't listen. I kept going on and didn't think anything of it.

On Monday afternoon when I was called out of class to the office, I had a certain feeling I was in a little trouble. When I sat down in the office, the principal started to ask me some questions. He asked me what had gotten in to me. He asked me if I thought I'd be able to pay for any damages to the trees. He was surprised and upset with me. He was confused just like I was and was wondering why I had done it. He gave me my penalty, a threee day suspension, and called it vandalism on school grounds.

I was disapionted in myself and didn't know how to react for it was the first time I had ever been in a situation like this. On the way home, I was wondering how my parents were going to react.

As it turned out, my parents were also disappointed at me and I got grounded. I knew that I deserved it. I knew that I wouldn't be able to attend the Prom that weekend. The only thing I didn't know was how long I was to be grounded.

When I returned back to school on Thursday, I felt weird. My classmates were freaking out because it was the first time I had gotten in trouble. I was really embarrassed when I asked my teachers to sign my suspension slip.

How a student and teacher choose to employ lessons like this can vary. Since each component of the lesson is presented separately, students need not see what is coming next, thereby facilitating meaningfully structured lessons. On the other hand, students may profit from previewing an entire lesson and then deciding whether to work through the entire lesson or to select those parts considered most meaningful. If they have previewed a lesson or are familiar with the techniques presented in the

lesson, they can move to whatever part of the lesson is most appropriate for their writing at the moment. When using this fluid medium, if the instructions say "change two sentences," the students do it and immediately can read the results. They are able to see how powerful the word processor can be as they experiment with their writing in these files.

Creating Computer Lesson Files

So that you understand how to create a lesson file, we will explain the procedure in some detail. If you know how to use the computer for word processing, you can create computer-writing lessons by typing the lesson material into a file using the word processor. You do not have to know programming, only word processing.

While computer lessons appear similar to the dittoed assignment sheets that some teachers have been creating for years, they differ from the dittoed lessons in both intent and function. When you ditto or photocopy a handout, you probably try to get as much information on a page as possible. With a computer lesson, the student deals with only one screen at a time. Therefore, in typing a lesson which the student will complete on the computer, consider the difference in media: reading a computer monitor is different from reading a page. As little text as possible should appear on the screen at any time.

When presented with a dittoed handout, the student simply follows the directions in a linear fashion. However, the fluid nature of the word processor differs markedly from the static page; it allows the student to move freely back and forth throughout the file, selecting bits and segments of writing to keep, to use as electronic note sheets, and to revise. In addition, when students complete writing exercises on the word processor, the same medium that they will use for drafting, they gradually master the word processing techniques they will need to use effortlessly when they write without lesson files.

If you are just beginning to use your word processing system, you will want to learn more about procedures for saving and loading files before proceeding. Each word processor is different, and these differences will affect the way you use lesson files with your students.

A few general suggestions may be helpful, however. If your word processor allows students to load exercises from your disk and save them directly on their disks, you will not have to bother with the time-consuming task of making disk copies of the exercises for each student. If your word processor allows a writer to print just a portion of a file, then students would have the option of printing just their responses to the exercise. Finally, depending on the number of computers you have and the time restrictions you are working under, you may want to develop

exercises which allow for students to complete some portions of the assignments with paper and pencil. If your word processor does not allow students to save and print just a portion of a file, you might want to divide the exercise into two parts: a part to be completed at the monitor and a part that can be completed on paper.

An Example of How a Lesson File Is Created

The following short lesson is designed to lead students from prewriting, through drafting, through revising, to proofreading, and to encourage the students to move freely from one phase of writing to another. Although the file may *appear* linear on the printed page, when it is displayed on the word processor it takes on the recursive features of its new medium: students see only one frame at a time and they use the commands of their software at will to move through the lesson, backing up to add extra ideas as they proceed or jumping ahead to the rough draft section whenever they are ready to write. We have intentionally used as many features of the word processing software as possible, directing students to use the arrow keys and the PAGE UP and PAGE DOWN keys (or whatever their equivalent might be on your computer) to move around in the file, to use the COPY and the MOVE commands to move answers from one section of the file to another, and to use the insert features of the word processor to add details while writing or revising.

Step one. Having first determined the purpose for the lesson, you write out the lesson, thinking of students as readers first, but writers foremost, and remembering that you may not be available while the student is working on the lesson. Try to use the full potential of the word processor in the files, directing students to rearrange sentences, move paragraphs, copy parts of files, or other activities as necessary. Here is an early draft of the first part of this lesson before we "redesigned" it for the computer screen:

> Writing Topic: An Autobiographical Anecdote
>
> In this assignment, you will write about yourself in a way that should interest a reader. We all have something worth telling others, but we often have trouble deciding exactly what to say. One technique is to write a generalization and support it with an anecdote.
>
> An *anecdote* is basically a little story that serves to prove a point. For example, if you wanted to prove how clumsy you were, you might write about the time you walked into your kitchen and broke three dishes within a minute, how your parent reacted, and why that proves your point.
>
> First, think of three generalizations you could make about yourself. Perhaps you might write about how you get nervous before tests

or the fact that you are the luckiest person in the school or something else that sets you apart from other people. Write your three generalizations below:

1.
2.
3.

Now, which of those generalizations can you support or illustrate with the best story about yourself?

Briefly, tell what happened.

Now use the following questions to help you think through your anecdote or story before you begin to write it:

Who will read it? What do you think that reader wants to read?
Why does that anecdote prove your generalization?
Why did that event happen?
Were any other people involved? How? Who?
How did other people react to what you did?
Do you think you could do that again? Why?
Do you want to do that again? Why?

Now, read over your answers to the prewriting questions above. Change anything that you'd like to change. Then begin writing your essay in the space below.

Step two. If you have already divided the lesson into discrete, sequential steps, you might want to number the lesson segments so that you can tell exactly where a student is by glancing at the screen. Also, you might want to separate each section of the lesson with dividing marks such as asterisks. In addition, by including just the right amount of space between each section, so that only one step appears at a time, you can make it possible for a student to "read" through the lesson, screen by screen, by pressing the PAGE DOWN key (PgDn) or its equivalent (for example, the Open Apple/down arrow key combination on the Apple IIe). When the student enters text at specified points in the lesson, however, using the down arrow key alone is probably more useful. Then the student can position text wherever he or she wants on the screen.

You might also want to use less than the full display area for your lessons so that your directions will stand out.

The complete lesson would now look like this:

****

1. AN AUTOBIOGRAPHICAL ANECDOTE

In this assignment, you will write about yourself in a way that should interest a reader. We all have something worth telling others, but we often have trouble deciding exactly what to say. One technique is to write a generalization and support it with an anecdote.

Before you begin, you might want to preview the entire lesson. To do so, simply press the PAGE DOWN key and read the lesson. You may, however, simply begin without reading the entire lesson. If so,

PLEASE MOVE TO THE NEXT FRAME.

****

****

2.

An anecdote is basically a little story that serves to prove a point. For exampl if you wanted to prove how clumsy you were ou might write about the time you walked into your kitchen and broke three dishes within a minute, how your parent reacted, and why that proves your point.

PRESS PAGE DOWN TO CONTINUE, PAGE UP TO REVIEW.

****

****

3.

First, think of three generalizations you could make about yourself. Perhaps you might write about how you get nervous before tests or the fact that you are the luckiest person in school or something else that sets you apart from other people. Write your three generalizations below:

a.
b.
c.

Now, which of those generalizations can you support or illustrate with the best story about yourself?

PRESS PAGE DOWN TO CONTINUE, PAGE UP TO REVIEW.

****

****

4.

Briefly, tell what happened:

PRESS PAGE DOWN TO CONTINUE, PAGE UP TO REVIEW.

****

****

5.

Now use the following questions to help you think through your anecdote or story before you begin to write your first full draft. ANSWER ONLY THOSE QUESTIONS THAT SEEM USEFUL TO YOU. ANSWER THEM IN ANY ORDER THAT YOU WANT.

Who will read it? What do you think that reader wants to read?

Why does that anecdote prove your generalization?

Why did that event happen?

Were there any other people involved? How? Who?

How did the other people react to what you did?

Do you think you could do that again? Why?

Do you want to do that again? Why?

Now, read over your answers to the prewriting questions above. Begin writing your rough draft in the space below. Remember, you can easily copy any of your prewriting responses to your rough draft by using the copy command of your word processor.

ROUGH DRAFT:

PRESS PAGE DOWN TO CONTINUE, PAGE UP TO REVIEW.

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6.

Reviewing Your Writing

1. What could you add to your essay?
2. What could you omit?
3. Would any part of what you have written so far be clearer to the reader if it were placed in another position? If so, move it there using the move feature of your word processor.

PRESS PAGE DOWN TO CONTINUE, PAGE UP TO REVIEW.

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7.

Revising Sentences

1. Check your sentence beginnings. Did you start several sentences with the same word? If you did, change a few of these sentences now.
2. Find two short, consecutive sentences. Can these be connected to form a longer, better-written sentence? Rewrite these sentences now.
3. Can you add any connecting words such as "but," "because," "when," or "however"? Look for ways to help the reader understand what you have written.

PRESS PAGE DOWN TO CONTINUE, PAGE UP TO REVIEW.

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8.

Would this story be more memorable if your generalization were at the end? If so, move it there and make it fit better.

PRESS PAGE DOWN TO CONTINUE, PAGE UP TO REVIEW.

****

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9.

Proofreading

1. Check all your punctuation. (Have you joined any sentences with a comma instead of a period? Do you need commas after any opening subordinate clauses?) Make necessary changes now.
2. Check your spelling. Perhaps have a friend read what you wrote to look for misspelled words.
3. Make sure you don't have any usage errors. (Have you written ''alot'' instead of ''a lot''? Do your subjects agree with your verbs?) Make any corrections now.

PRESS PAGE DOWN TO CONTINUE, PAGE UP TO REVIEW.

********** **********

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10.

Now, go back to your story and read it one more time. If you want to make any more changes, do so. Then return to this frame.

PRESS PAGE DOWN TO CONTINUE, PAGE UP TO REVIEW.

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  11.

                HAVE YOU SAVED YOUR STORY?

              Don't turn the machine off.

          SAVE your autobiography with anecdote now.

**************************END*****************************
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On the printed page, this lesson appears very much like a printed ditto sheet of a linear writing lesson. In the computer, however, the lesson becomes a fluid medium, expanding as the student writes and allowing the student to make critical judgments about whether to continue writing or to move back and forth from prewriting to revising to drafting and so on. If students save the results of their prewriting on the same disk on which they will be doing their writing, they can easily move their responses from the lesson file to the rough draft file. Once you become comfortable with the concept of the computer-writing lesson file, you can create lessons that most reflect the way you teach writing and you can experiment with the formats that are the most productive for your students. Ultimately, students will move from learning with the lesson files to writing independently on the word processor.

Adapting Successful Teaching Strategies to Computer Writing

As researchers have discovered much about how writers write, teachers have developed some useful pedagogies for translating research into practice. Some of the most popular methods are: conference teaching, collaborative learning, journal writing, and "I-Searching" (authentic research writing). All of these techniques can be adapted successfully to the computer-writing classroom. In fact, these techniques may even be more effective when students write with computers than when they write with paper and pencil. Since students revise easily with a word processor, you can encourage more experimenting and revising. You can expect students to come to class with multiple copies of drafts—knowing that they can easily get printouts for all the students in their peer review groups.

The techniques you choose to adapt and how you adapt them will, to some extent, be influenced by your individual situation. If you have a self-contained "computer classroom," with a computer for each of your students, you will adapt these approaches differently than if you have a classroom with only a few computers. Even if you teach in a room which has no computers, you might consider modifying some of these methods to fit your situation—as long as your students have access to computers

after class, in a computer lab, at home, or elsewhere. For instance, although you can't be there while students write, you might be able to arrange after-class conferences in your office (if you have a computer) or in a nearby computer lab. If possible, you might occasionally bring a computer to class or take your class to the computer lab so that you can demonstrate computer-writing strategies and so that you can illustrate how writing with a word processor helps to make writing more truly recursive.

I. The Conference Method

There are different ways of using conferencing techniques while teaching writing. Two popular ones are the so-called Garrison approach (Garrison 1974) and the approach developed by Donald Murray (1968) and revised by Thomas Carnicelli (1980). In both approaches, teachers help students conceive and refine their ideas. The Garrison approach involves a workshop method of writing: students work on their writing while the teacher moves around the room, assisting writers throughout the writing process. The Murray and Carnicelli method usually revolves around an office-hour or free-period conference between teacher and student: the teacher sets up appointments and meets individually with each student for at least ten minutes per week. High school teachers sometimes modify this approach by conducting short conferences with individual students in a corner of the room while other students work at their seats. Carnicelli distinguishes between the student's and the teacher's role in this kind of conference: students must be encouraged to explain what they intended to say in a paper and teachers must learn to listen to what the student is trying to say and then help that student move on with the paper.

Both methods assume that teachers will be involved in student writing while it is in progress—not just after it has been completed. Next, both methods assume that students are learning that writing is a process and that to complete that process writers talk with others and get advice. And finally, in all versions of the conference method, students' papers are treated as drafts, and teachers offer advice about all stages of writing—prewriting through proofreading.

The Computer-Writing Conference

The computer-writing conference can do all that either of these traditional approaches to conferencing can do, and much more, especially if a teacher is using the workshop method of teaching writing (Sudol 1985). The only prerequisite for a computer-writing conference is that the teacher and student have access to a computer.

In the traditional conference, the student comes prepared with a product—a handwritten version of the prewriting or of the draft. Suggested changes must be jotted down in the margins and between lines. In the computer-writing conference, the student's words are—by virtue of the technology—impermanent and in-process. The student can try out an idea while the teacher watches. If the thesis sentence doesn't fit the examples, teacher and student can experiment. The student can erase the sentence and try another one. If the organization doesn't seem to work, the teacher can suggest that the student move several paragraphs around. During the computer-writing conference, the student might get an insight into overall coherence by experimenting with the suggested changes and discussing them with the teacher. Left alone, the student might not bother. In the traditional conference, the student might not understand the suggested changes and certainly wouldn't be able to see their immediate effect.

The after-class computer-writing conference. Ideally, a writing teacher would be able to meet frequently with the entire class in the computer lab, watching students' writing evolve and assisting students when they need help (using the Garrison approach to conferencing). Otherwise, teachers could help students throughout the computer-writing process by meeting with them individually in front of a computer monitor either in a corner of the regular classroom or in an office equipped with a computer (using the Carnicelli or the Murray approach to conferencing). In this case, students already would have completed some of their writing and the teacher would not be able to help students at the exact point where they need help. But by requesting that students save their prewriting and their early drafts in separate files, teachers would have a window into their students' writing processes and could suggest the same kinds of help that they would suggest to these students if the writing were being done in front of the teacher.

If teachers have access to a computer lab after class, they might arrange to meet in the lab to work with small groups of students simultaneously (Nickell 1985). Students can bring multiple versions of their writing with them, in hard copy and on disk. They can be directed to load their programs and start working on some part of their writing as the teacher moves from one student to the next. If they have similar problems, the teacher can talk to two or more students simultaneously. This is the teacher's opportunity to help students with the technology, too. The teacher can demonstrate computer-writing strategies for different phases of the writing process. The teacher can also observe students at work on portions of their writing and, as the year progresses, remind students of some of the powerful word processing techniques that they may have forgotten.

In-class computer conferences: prewriting. Teachers can either try to move students through an assignment at the same rate or they can allow students to move independently from prewriting through final printout, helping students with their writing as it develops.

When students write with pen or pencil, it is difficult for teachers to help. Students' handwritten prewriting is much more illegible than their finished drafts. Thus, teachers often have difficulty initiating conversations about students' developing ideas. But at the computer, teachers—if invited—can easily read over what students have written and can also help them adapt their writing processes to the computer.

Some teachers may have access to some of the computer-prewriting programs available (Burns 1980; Schwartz 1982; Wresch 1984; Rodrigues and Rodrigues 1984; Schwartz 1985). Other teachers will be helping students prewrite with the word processor itself. Still other teachers will help students use prewriting lesson files (see Appendix, p. 53). In all cases, teachers should demonstrate prewriting techniques and observe students using them in class. Teachers who are present while students are using the programs or while they are inventing ideas with the word processor can help them select useful heuristics, encourage them to add more ideas to their brainstorming lists, discuss their topics and help them focus on a main idea, and help them decide when they are ready to move toward a rough draft. Moreover, if students have learned how to use computer-prewriting techniques in class, they are more likely to use those techniques when they write independently.

Well-known prewriting strategies such as brainstorming, freewriting, and nutshelling work well at the computer. However, teachers need to provide guidance as students practice using these techniques. For example, teachers might suggest that students brainstorm by listing all the ideas they can think of at the top of their monitors. Then students can move their list of ideas off the screen and begin freewriting without looking at the list. They can, if they want, move back to the original list of ideas and insert new ideas that emerged during their freewriting. Finally, students can write a nutshell statement before moving on to a rough draft. In order to save their prewriting and nutshelling so that they can refer to it later, students might move it all to a separate file (using whatever techniques their word processing software requires). Then, while drafting, they can refer to their prewriting and add more ideas to their lists.

Computer conferences: drafting and revising. Many teachers who don't see how the word processor will make an impact on teaching writing as a process might change their minds after observing a computer-writing session where students are drafting their papers. Teachers of computer writing can help students move back to prewriting when appropriate and

can have students revise several times while drafting. If two students are at similar stages of their writing, teachers can suggest that the students exchange monitors, review their partner's writing, then return to drafting—incorporating any useful peer advice. Then teachers can help students decide what peer advice to follow and what to ignore. Teachers can encourage students to get hard copy of their emerging text when they need to. In a traditional writing classroom, the teacher can do little but wait for students to ask for help while they are drafting. In a computer-writing classroom, teachers can play a meaningful role throughout the writing process.

A teacher can help students develop ways of proceeding which fit the assignment and which fit their individual drafting preferences. If students are ready to plunge in and work through a "zero draft," then teachers need to respect the students' need for privacy. If students need help getting started, teachers can suggest some techniques. They might, for instance, suggest that the students create an outline and then start writing about whatever section of the paper seems most enjoyable. As students write, they may find that they need more details or ideas about their subject. Teachers can suggest appropriate heuristics or recommend that students find out more about their topics before moving ahead.

When students finish a draft, they often want to rush toward closure. But with the teacher available, students can be encouraged to use many reviewing and revising strategies. By first demonstrating revising strategies, teachers can encourage students to revise sequentially: first for content and organization; next for syntax, diction, and coherence markers; and finally, for mechanics. Teachers might, for instance, recommend that students use the PAGE DOWN key to move from one chunk of text to another during content and organizational revision, but that they use the cursor to move line by line to guide their review of material when they are revising for syntax, coherence, or diction.

Computer ences: editing. Too often, students save no time for the last part writing process: editing and proofreading. Teachers can help in many ways. They can sit with students and demonstrate computer-editing techniques. For instance, they can recommend that students use the cursor as a marker for moving slowly—word by word—through the text. They can recommend that students use the FIND function of the word processor in different ways: to FIND periods, for example, so that students can then focus on each sentence before the period to see if it is grammatically correct; to FIND *be* verbs, so that students can revise passive structures; or to FIND commas, so that students can determine if each has been used correctly. Teachers can ask students to read aloud to another student or to the teacher and then

make appropriate changes as they read. If students are using a style-checking program such as Grammatik, teachers can help students resist the temptation to follow the computer's advice blindly by reminding students that they need to be in charge of their own writing.

II. Journal Writing

Journals have waxed and waned in popularity in the last two decades, but continue to be useful, especially when they are treated seriously by both teachers and students and when they are viewed as an integral part of the writing course. To read or not to read, to grade or not to grade, to assign entries or not to assign entries—all this depends on the individual teacher and the class for which the journal is designed.

Students can use journals in many ways: to record ideas for themes, to keep reading notes for their courses, to respond to readings, to write about happy or sad events in their lives that they want no one else to read.

Electronic Journal Writing

Certainly journals are valuable when written on paper, but think of the organizational problems that are solved when students use computer disks for their journals. Students don't need to buy spiral-ring notebooks with divider cards. In order to separate sections, all they need to do is open new files on their disks. If they start writing something they really like, they can keep working on it and use it for a theme. There are no messy pages. And probably most important, if students want to keep parts of a journal entry intact in their theme, they can do so without retyping the entry.

Organizing the electronic journal. Whether students' journals are on a disk or in a notebook, to set up their journals, students should first create a table of contents. With an electronic journal all they need to do is open a file and call it "Contents." Then after or before they have written an entry, they can record the date and the assignment in their contents file. In that way, they will be able to find whatever entry they need without any problem. If students need more than one or two lines to write the assignment, the word processor will allow the space between lines to expand to fit their requirements. Of course, if students prefer to keep their table of contents page on a sheet of paper, they can update it by recording each new entry as soon as it has been completed on the word processor.

The method for organizing a journal shown in Figure 1 might be useful for students who have to keep different kinds of entries in one journal.

Figure 1

Journal Contents

I. Free Choice Entries

Date	Assignment	File Name

II. Reading Summaries and Responses

Date	Assignment	File Name

III. Assigned Entries

Date	Assignment	File Name

Writing the entries. After students have determined an appropriate organization for their electronic journals, they are ready to start writing. Students may prefer to use a totally blank disk and set up files as they go. Or, if they have been given definite assignments with due dates attached, they can set up their entire journal at the beginning of the semester and then just open the files as they want to fill them with writing. In either case, students' journal disks should include only journal entries. If teachers want students to submit a few entries, they can suggest that students print them in specified ways, triple-spaced to allow for comments, for example. No longer must the teacher attempt to write between lines which are too close together to insert lengthy comments.

Moving from journal to theme. When students find an entry they would like to use as a theme, it would be best if they transferred that

entire entry to a new file, preferably on a different disk. When students have recopied their entries onto "theme" disks, they can move in many different directions. Here is one suggestion. First, they might add to or delete part of their original entry and rearrange the material they want to use. Next, they could create a working outline and fill in different parts of the outline as they produce a rough draft.

III. Collaborative Writing

Based largely on the work of Kenneth Bruffee (1973), the concept of collaborative learning has been gaining popularity. Essentially, Bruffee contends that students learn more from their peers than they could possibly learn from teachers. Teachers who follow Bruffee's ideas typically divide their classes into writing groups at the beginning of the year or semester. Bruffee recommends that these students stay together all year in order to build trust among group members and to encourage students to care about the quality of help they give to one another. Throughout the writing process, students respond to one another's writing, answering different kinds of peer review questions and discussing ideas as an assignment moves toward completion.

At the prewriting phase, questions like the following might be included on peer review sheets: Can you add any ideas to the writer's list? Do any ideas seem unrelated to the topic? At the early rough draft phase students might respond to questions such as: Is there anything you would like to know more about? Can you suggest places where the writer might add details? At the late rough draft phase, teachers might ask students to respond to these questions: Can you suggest changes in sentence structure? Can you suggest changes in word use? Can you find some places where the writer might add some transitions? Then at the editing phase, writers might complete editing sheets for their group members, listing places where they detected errors and suggesting corrections.

Collaborative Writing with Computers

A common thread in research on computers and writing is the increasingly social nature of computer writing. Although some students are reluctant to share their writing, most enjoy being able to see one another's work as it emerges. Teachers report that students engage in more discussion of writing even when they have not been specifically told to do so. They talk about their writing at the beginning of the class period. They discuss one another's writing on the spur of the moment, asking for help when they need it.

Formal peer review techniques also work well in computer-writing srooms, and in a more dramatic way. Instead of responding to peer

review questions on a sheet of paper, students can insert their suggestions in brackets within a peer's writing. All members of a writing group can cluster around one computer at a time, with one student entering suggestions at the monitor. Or, students can independently review their group members' writing. Consider the following example of a student's response to an early rough draft questionnaire (completed at the computer) which asked the peer reviewer to note places where the author might add ideas, places where she should delete ideas, and places where passages were confusing:

> Although I have always lived in the city, I had never realized all the beauty nature has to offer, but on a recent camping trip to the Gila National Forest, I began to notcle all the magnificent objects in the forest. [TELL WHERE YOU ARE IN THE GILA.] Walking passed an assortment of wild flowers, [DO YOU KNOW WHAT KIND OF FLOWERS THEY WERE?] I came to a stream where the water was crystal clean. Looking down into the water, I could see all the tiny fishes [WHAT KIND OF FISHES?] swimming about. As I sat near the stream looking into the water [YOU DON'T NEED TO REPEAT THE WORDS "LOOKING INTO THE WATER." I THINK YOU CAN OMIT THEM.] the quiet and peacefulness of the forest cought my attention. There was no noise pollution except for the sing of the birds, which was a delightful sound to hear.
>
> As I continued my walk, I approached one of the scenic views. Looking over the scenery, was a beautiful sight to see. [I'D LIKE TO KNOW WHAT YOU SAW. MOUNTAINS? RIVERS?] It was perfect the way nature had arranged the landscape.

While reviewing a peer's work at different stages, students can also notice the changes that the writer made after the first peer review session. A later rough draft questionnaire which asked students to suggest improvement in sentence structure, diction, and coherence resulted in the following responses:

> Although [DO YOU MEAN SINCE?] I have always lived in the city, I had never realized all the beauty nature has to offer, [I THINK YOU SHOULD START A NEW SENTENCE HERE] but on a recent

camping trip to the Gila National Forest, I began to notcie all the magnificent objects [I DON'T LIKE THIS WORD HERE] along the Mimbres Trail. Walking passed an assortment of Indian Paint Brushes and other wild flowers, I came to a stream where the water was crystal clean. Looking down into the water, I could see all the tiny minnows swimming about. As I sat near the stream, the quiet and peacefulness of the forest cought my attention. There was no noise pollution except for the sing [DO YOU MEAN SONG?] of the birds, which was a delightful sound to hear.

As I continued my walk, I approached one of the scenic views. I saw giant pine trees and mountains for miles and miles around. Looking over the scenery, was a beautiful sight to see. [THE LAST SENTENCE SHOULD BEGIN LIKE THIS: **LOOKING OVER THE SCENERY, I . . .] It was perfect the way nature had arranged the landscape.

At the editing stage, students can help one another find errors in spelling or punctuation. Placing an asterisk on either side of a misspelled word (*recieve*) can help a writer locate the possible problem immediately. In fact, by using the word processor's FIND function, a student can search for each instance of an asterisk, replace the misspelled word with a correct spelling, and continue searching. The following sample, including the student's changes in response to peer review, has only four misspellings. Thus the FIND function would not be necessary.

Since I have always lived in the city, I never realized all the beauty nature has to offer until I took a camping trip to the Gila National Forest, I began to *notcie* all the magnificent works of nature such as the gnarled Juniper trees and the sculptured rocks along the Mimbres Trail. Walking *passed* an assortment of Indian Paint Brushes and other wild flowers, I came to a stream where the water was crystal clean. Looking down into the water, I could see all the tiny minnows swimming about. As I sat near the stream, the quiet and peacefulness of the forest

cought my attention. There was no noise pollution except for the singing of the birds, which was a delightful sound to hear.

As I continued my walk, I approached one of the scenic views. I saw giant pine trees and mountains for miles and miles around. Looking over the scenery, I *though* about how much more beautiful this was than my home town of Albuquerque. It was perfect the way nature had arranged the landscape.

Whether students engage in peer review using traditional techniques or computer-tailored strategies, teachers need to be careful not to encourage a linear view of the writing process. Students need to learn how to write recursively, adding and deleting ideas as they write.

At first, it is probably best to have students look at only one or two features of their peers' writing at a time. In that way, students focus on discrete elements of writing, and in addition to helping their peers, they learn what to look for in their own writing. But to help students develop a recursive attitude toward writing, teachers should encourage students to continue offering content and organizational advice throughout the writing process, even when writers are at the editing phase of an assignment.

IV. The I-Search Method of Research Writing

Richard Larson has argued that the traditional research paper is an artificial exercise with no real-world counterpart (Larson 1982). Although college students may be asked to do research in other disciplines, the papers will vary widely in format and expectation. For a teacher who wants to present research skills, Ken Macrorie's concept of research writing as reported in *Searching Writing* (1980) offers exciting alternatives. Macrorie recommends that instead of writing the traditional research paper—a collection of quotes and paraphrased passages about topics of little interest to students—teachers assign what he calls the "I-Search" paper.

In I-Search papers, students present the results of their explorations and discoveries about a topic that "chose" them, a topic that was compelling because it had to do with their personal interests and needs. For example, some students might be interested in buying their own personal computer and, therefore, might—in their I-Search papers—report on the interviews they conducted with local computer dealers, the prices and product lists found in computer magazines, and the results of questionnaires given to students who already own computers. When students

report the results of their searches, they use an informal format, telling not only what they found, but also how they carried out the search. The process of research becomes as important as the finished product—the I-Search paper.

Researching with Computer Tools

Beyond the word processor, what computer tools might help students collect, organize, and report data for I-Search papers or other authentic research projects? Several products designed initially for the business world are appropriate for budding student-researchers. For gathering data, students could search data bases in subscription services such as DIALOG, CompuServe, or the Source. (For example, DIALOG gives users anywhere immediate access to the Library of Congress catalog in addition to an index of 76,500 serial publications.) For sorting and storing information, students could set up data bases with data management programs, programs that allow writers to use the computer as an electronic filing cabinet for their notes. Then, for organizing and structuring ideas, writers could use programs called "idea processors" to build flexible, working outlines for their papers. And finally, for help with the tedious chores of typing and formatting bibliographies and footnote lists, some students might like to use a powerful word processing program that includes indexing, footnoting, and bibliography-generating capabilities.

Searching for data: subscription data services. Instead of merely looking up articles in *The Readers' Guide to Periodical Literature,* students with access to a subscription data service (a service individuals or schools must subscribe to or join and then pay either monthly fees or fees for "connect" time to various data bases) would begin by searching their data base by entering key words related to their topics. The data base would provide them with a preliminary bibliography. Rather than have a third party (typically, a librarian) do the actual searching, students themselves would determine key words and direct the search. To do so, they would need a computer with a modem so that they could "call" a variety of data services, perhaps using some data bases that provide access to entire articles or abstracts of articles which the students can "down-load" (send the text through the telephone lines). If the key words used in the initial search produced minimal results, students could immediately change the words and continue searching. They would, in effect, be creating their own "case book" of articles related to their individualized research project, a collection which might be submitted to their teacher along with their finished paper (a surefire way to prevent plagiarism).

Of course, research in general, and I-Searching in particular, involves more than collecting information from books and magazines. It can in-

clude such tasks as interviewing people, conducting surveys, and observing situations. Certainly the computer can't help with all of these ways of gathering data, but it could help students interview experts on their subjects. By dialing a specialized "bulletin board" (a centralized computer service), students might be able to locate someone who knows about their topic and who would be willing to correspond with them "on-line," by writing computer messages to the students. At New York Institute of Technology, some students are enrolled in courses taught exclusively on a computer network. These students can "talk" in writing to their professors, to their peers, and to others involved in the computer conference, including experts in various subject areas from all parts of the country.

Storing data: data base management programs. A few products called "free-form data management programs" are especially useful for writers. Similar to the concept of a large data base like PsycINFO or ERIC, data management programs such as Data Fax and Notebook allow writers to create their own collections of information. Writers first type summaries of books or articles they want to include and then label them with key words to use when they want to retrieve the information later. This kind of program would be most useful for writers with much information to sort and organize.

Among the varieties of data management programs, some require the writer to use his or her own word processor to set up the information (e.g., Superfile); others require the writer to set up several "fields" or categories at the top of the screen before entering notes about those topics (e.g., Notebook); and still others consist of blank screens on which the user enters any information in any order. Then, before saving the "file," the user identifies several key words (e.g., Data Fax).

Organizing data: idea processing software. Another breed of program, designed initially for business use, but now beginning to interest writers, is "idea processing" software such as Think Tank and MaxThink. These programs help writers to generate outlines, to reorganize their outlines, and most important, to move between outlining and writing. For instance, a writer might start brainstorming a paper by outlining, then decide to comment on an idea. With an idea processor, the writer can then press a key which will hide the comments from view, allowing the writer to focus on the paper's emerging outline. If the writer wants to see only the main points of the outline, he or she can "collapse" or hide any designated subpoints and see the overall movement of a paper at a glance.

Idea processors allow the writer to print out the outline in one of several forms: as a table of contents with roman numerals, as a list with numbered and indented categories (1, 1.1), or as an unlabeled list. The writer can choose whether to print only the major headings in the outline, designated subpoints and the major headings, or everything that has

been entered. By loading the finished outline on his or her word processor, the writer can continue to revise and restructure while writing.

Still another form of idea processing software is beginning to intrigue writers: the so-called integrated software, which includes not only a word processor with an outline-generating capacity, but also a spreadsheet (for calculating and graphing numerical data) and a data base. In Framework, for example, each piece of information—text, graphs, charts—is assigned a frame number. If a writer wants to generate the structure of a paper first by outlining, then each point or subpoint in the outline becomes a frame. For a writer who needs to incorporate charts, graphs, and numerical data into a researched report, this kind of product could indeed be useful.

Completing the paper: word processors with index compilers and table of contents, outline, bibliography, and footnote generators. Writers preparing lengthy reports or research-based papers might also like to use a more sophisticated word processing system than they are presently using. Some programs (such as Samma Word III) have an index compiler, a table of contents generator, and an outline generator. With the index-compiling feature, the writer must first create a list of items to appear in the index. The program then searches through the text to find these items, arranges the items alphabetically, and indicates the page reference for each. If the writer would like a table of contents, he or she goes through the document inserting special markers for items to be chapter headings or subheadings. Then the program can be directed to print a formatted table of contents.

To outline an already existing piece of writing with this kind of program, the writer places special markers at appropriate places throughout the text and then directs the program to print an outline. If the writer then changes the text, the outline generator will automatically revise the outline. This latter feature would be especially useful to a writer at the revision stage. The writer could produce a descriptive outline, useful to the writer for seeing the structural weaknesses in an early draft. Then, having reorganized the outline on the word processor, the writer could rewrite before directing the program to print another completed outline.

Some programs include features which automatically generate a bibliography of works cited. A program called Bibliography must be used in conjunction with Notebook (mentioned above) and with the writer's own word processing program. A writer first uses Notebook to enter bibliographic data along with as many notes as the writer chooses to include about each item. Then the writer completes the paper, using any word processor. Finally, the Bibliography program "reads" through the paper to determine which works were actually cited and then gets complete bibliographic data from Notebook. The result is an alphabetized biblio-

graphy in whatever format the writer needs—APA, MLA, or others. (These products are described in detail by Bryan Pfaffenberger in the January 1985 *Research in Word Processing Newsletter.)*

Writers who dislike typing footnotes might prefer to use a word processor with footnoting capability. Einstein Writer and Microsoft Word are two excellent programs which, with their split-screen capacity, allow a writer to place notes and direct quotes from a source on one screen while drafting on the other screen. Or, a writer could use an inexpensive program such as Termpaper which has automatic footnoting capability.

Implications for teaching research skills. The computer technology itself may help us redefine the nature of research assignments. The computer-writing tools may suggest new kinds of research assignments which will engage students. For instance, consider a class investigative assignment (a "we-search" paper) looking into local history or into local problems, such as a hospital's attempt to block the construction of any other hospitals in the town. Or, students might want to determine why some towns in New Mexico turned into ghost towns while nearby towns flourished. Each student could contribute bits and pieces of data to a data base built exclusively for one of these topics. Together, students could watch patterns emerge and could continue to collect new information to test the patterns. They could use some of the computer tools described above to sort and organize their information.

Presently, however, these products all have limitations. Since none of the products, with the exception of Termpaper, were specifically designed for academic research writing, they need to be refined and reconceived before they fit the total needs of secondary and college writers.

Conclusion

What effect does the word processor have on students' writing? What teaching strategies work best in the word processing classroom? It is much too early to try to summarize conclusively. Students' writing improvement occurs gradually, with occasional spurts and sputters. To point to any one teaching technique and say "That is the technique that made this or that student a writer" is most often an impossible task. Good writers develop over time, accumulating skills from their teachers, and benefiting from experiences no one has consciously taught them. The advent of the computer adds one more twist, but it is a twist that can be a marvelous opportunity to spur on students even faster.

We would like to believe that, ultimately, computers will favorably affect the quality of student writing. But only longitudinal studies will be able to demonstrate whether writing improves more dramatically when

students write with word processors. Future ethnographic studies may describe specific strategies and behaviors that affect writing development in computer-writers.

Successful teaching practices will, no doubt, influence researchers as they design their experiments and case studies. As teachers develop and share strategies for teaching writing with computers, they will begin to learn which techniques work best. In this book, we have touched upon the types of activities you might try with your students. As you develop more experience teaching writing with the computer and as you acquire more sophisticated computer-writing tools, you will undoubtedly think of more yourself: skill files to keep track of student weaknesses and strengths, technological ways for your students to share their writing with students they might never meet face to face, electronic bulletin board applications, case study approaches to writing, context-based writing lessons, and so on. Sometimes you will devise new approaches that can only be accomplished with a computer, but often you will simply adapt the techniques of teachers who have taught writing without a computer. Our ideas for lesson files, for example, were inspired by the work of Stephen Marcus (1984) and Paula Nancarrow (1983). The utter simplicity of the technique opened up an entire world of ideas.

As you devise new ways to teach with computers, we advocate, along with Colette Daiute (1983b), that you make the teaching of computer-writing more than just an exercise. Teachers must find ways for writing instruction to be framed in terms of real communication. Why should students write compare-and-contrast essays if the only purpose is to learn n artificial form? A better type of assignment might be to ask them to compare one governmental practice with another and then advocate one or the other—or perhaps their own third idea. Issues important to young people, such as the drinking age or teenage suicide, will move them to want to communicate better, especially if they perceive a real audience for their efforts. Computer-based lessons might lead them to gather and store information, to juxtapose one idea with another, to try out an idea with a peer, or to attempt any other task that calls for a real writing context.

The computer becomes, then, a powerful tool. The teacher becomes, then, a powerful ally, peer, and colleague of the student writer, one who can encourage students on to even greater efforts. The suggestions for teaching that we have included should serve only as a beginning. We hope that each writing teacher who reads this will experiment with new approaches and share the results with other teachers.

Appendix

Lesson Files

These sample lesson files are included to give you an idea of the kinds of activities you can create with your word processor. You can use them as is, or you can modify them to fit the individual needs of your students or your own teaching methods. Use them simply as examples of what you might do. Experiment with different formats and emphases. You might prefer to develop a series of prewriting lesson files rather than whole-process lessons or you might want a number of different revising heuristics. If you are pleased with some of your current techniques, knowing that they result in productive student writing, consider adapting them to the computer.

If your students write with a word processor regularly, then you might not want lesson files, since you will be helping students as they write and as they interact with each other's writings. However, since you cannot be with all writers at all times and since different writers may be at different stages, thereby needing special types of support, the lesson files may:

1. introduce students to new techniques
2. provide a variety of approaches to common tasks
3. review techniques learned earlier in the course
4. reinforce new techniques as they are introduced.

I. Prewriting Activity Files

Students can use the following prewriting files to practice specific prewriting skills. Later, having learned the prewriting skills, the students might simply use the files to remind themselves about the techniques, without needing to work through the entire file.

****

1. FREEWRITING

Using the three words below, write a sentence. Then, using that sentence as your topic sentence, write as much as you can for five minutes. Try not to stop writing. Don't worry about spelling, usage, or punctuation. Just write, write, write.

MUCH

PARENTS

CONCERN

WRITE YOUR SENTENCE HERE:

START YOUR WRITING HERE:

STOP WRITING AFTER FIVE MINUTES AND CONTINUE WITH THE LESSON.

****

****

2. NUTSHELLING

Now, reread what you have just written. When you finish, return here and summarize what you have written in one sentence.

WRITE YOUR SUMMARY SENTENCE HERE:

What you have written is known as a NUTSHELL sentence.

PLEASE MOVE TO THE NEXT FRAME.

****

****

3.

Now, without rereading your nutshell sentence, try writing it here:

USING THAT SENTENCE AS YOUR TOPIC SENTENCE, WRITE FOR ANOTHER FIVE MINUTES ON THAT TOPIC.

START HERE:

WHEN YOU FINISH, MOVE TO THE NEXT FRAME.

****

****

4.

You have just practiced

FREEWRITING,

NUTSHELLING,

and

FOCUSED FREEWRITING

as prewriting techniques. Sometimes they help writers focus in on what they really want to say.

SAVE this activity file and put it in your learning log so you can remember the techniques at a later date.

SAVE THIS ACTIVITY FILE NOW.

**********END**********

Invisible Writing

This next technique was first described by Sheridan Blau and Stephen Marcus (1983). It is called "invisible writing" because the writer cannot see what he or she is writing. Some students are too concerned about getting their sentences perfect and so spend more time trying to perfect their sentences than getting their ideas down. In order to force students to think of what they want to say next and to keep writing, this technique asks students to turn off their monitors while keeping their computers on. Then, they freewrite for a period of time, turn their monitors back on, reread what they have written, and use it as the basis for their next writing.

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**********************************************************

  1.                INVISIBLE WRITING

  This prewriting technique is designed to force
  you to keep writing, keep writing, and keep
  writing. It is really quite simple. All you have
  to do is turn off your monitor and write without
  looking at what you are writing. DO NOT TURN OFF
  YOUR COMPUTER.

  FIRST, THINK OF YOUR TOPIC. WRITE IT HERE:

  PLEASE MOVE TO THE NEXT FRAME WHEN YOU ARE
  READY.

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  2.

  PLACE YOUR CURSOR AT THE END OF THIS SENTENCE,
  TURN OFF YOUR MONITOR, AND START WRITING ABOUT
  YOUR TOPIC NOW.

     WHEN YOU FINISH, TURN YOUR MONITOR BACK ON.

  You may want to print a copy of this file for
  your learning log, so be sure to SAVE this file
  before you turn the computer off.

**********************END**********************
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Creative Problem Solving

This next prewriting file is designed to help students break away from stereotypical responses. How many of us have had students write that "school is like a prison" or other clichés? In this technique, students are asked to think in analogies they might ordinarily never conceive.

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  1.                VISUAL SYNECTICS

  VISUAL SYNECTICS is a technique writers or
  scientists or business executives use sometimes
  to think of creative ideas. To use it, all you
  have to do is compare the topic you want to
  write about with any object that you see.

            PLEASE MOVE TO THE NEXT FRAME.

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  2.

  For example, suppose I wanted to describe my
  teacher. First, I would look around the room and
  type in things that I see:

    1. a window
    2. desks
    3. students
    4. a cloud outside
    5. chalk

  Then, I would ask myself how my teacher is like
  each of the items I have typed.

    Perhaps MY TEACHER is like A WINDOW
    because I can see right through him.

    Or perhaps MY TEACHER is like A WINDOW
    because she sheds light on a lot of
    confusing subjects.

  After I decided upon the analogy or comparison
  that I prefer, I start explaining it.

            PLEASE MOVE TO THE NEXT FRAME.

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3.

Now, you practice. Here is a topic:

MY WRITING

Pick one of these objects to compare to your topic:

A MAP

A BLACKBOARD

A PLANT

Complete the following sentence and write at least three sentences explaining it:

MY WRITING is like:
because:

WHEN YOU FINISH, PLEASE CONTINUE.

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4.

Here are some things that other students wrote:

My writing is like a map of the world because you never know what to expect in it.

My writing is like a blackboard because I am always erasing my ideas before I finish them.

My writing is like a plant because you have to dig to find the root of an idea.

PLEASE MOVE TO THE NEXT FRAME.

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5.

Now it's your turn to create your own analogy and write about it. First, think of some topic to write about.

TYPE YOUR TOPIC HERE:

Now, list five things you see in your classroom:

1.

2.

3.

4.

5.

How is YOUR TOPIC like each of those five things? Complete each sentence:

My topic is like item 1 because:

My topic is like item 2 because:

My topic is like item 3 because:

My topic is like item 4 because:

My topic is like item 5 because:

PLEASE MOVE TO THE NEXT FRAME WHEN YOU ARE READY.

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6.

The prewriting technique you have just learned is called VISUAL SYNECTICS.

In your own words, explain how to use VISUAL SYNECTICS to help you think of new ideas to write about:

When you finish, SAVE your file and put it in your learning log to help you remember the technique later.

SAVE YOUR FILE NOW.

**********END**********

II. Review and Response Files

Student self-review and peer review files can be included as part of complete lesson files or as separate files which can be loaded after any writing assignment. This lesson file includes some typical questions and computer applications that can be combined into any writing activity designed for the computer.

You can devise any number of variations upon this approach. For example, you can tell the peer reviewer to list all the misspelled words at the bottom of the file, to put a capital P at the beginning of every line with a punctuation error, or, if the file created is double- or triple-spaced, to write comments in between the lines, in all capital letters. By placing a peer's or the teacher's review comments on the file itself, the concept of the fluidity of the word processing medium is reinforced.

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                    PEER REVIEW ACTIVITY

  Find the sentence that you like the most. Put an
  asterisk (*) in front of the sentence, and then,
  at the bottom of the file, tell why you liked
  the sentence.

  Find the sentence that you think is the weakest
  in what you have read. Put a number sign (#) in
  front of the sentence, and then, at the bottom
  of the file, rewrite the sentence to improve it.

  Do you disagree with anything the writer has
  said? If so, put your comment in brackets [] so
  that the reader can find what you think.

  Has the writer written anything that is very
  meaningful to you or that really makes a strong
  point? If so, write your response enclosed in
  ampersand (&) symbols so that the reader can
  find what you think.

**************************END***************************
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Peer Review Questionnaire

This lesson file works well at the beginning of a writing course, when students may be new to computers and to peer reviewing. By asking students first to simulate the review process using model student papers

and then to review their own papers, students get structured practice in reading and responding to one another's writing directly at the monitor. Working directly at the computer gives them practice using the word processing movements that they will later need to revise their own writing.

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1.              PEER REVIEW EXERCISE

You will need a partner for this exercise. The
exercise has two parts:

  1. Simulated peer review

  2. Real peer review

Each of you will work at your own computer. When
you finish responding to one another's papers in
writing, you will have a chance to sit together
and discuss your comments.

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2.        PART ONE: SIMULATED PEER REVIEW

Two sample student papers have been saved on
your disk under these names: Sample 1 and Sample
2. These papers are models of the same kind of
writing you did for today. Read these papers
now. You will use them for the next part of this
exercise. In a few minutes you will be asked to
play the role of the writer for one of these
samples. As you read the papers, try to grasp
the writer's meaning and purpose. If you want to
save them on your disk for future reference, you
can.

WHEN YOU ARE READY TO CONTINUE, USE THE CURSOR
KEYS TO MOVE TO THE NEXT SCREEN.

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3.

When you role-play the writer, remember that your reviewer is trying to help you. Read the comments with an open mind. Don't be defensive. If the reviewer suggests changes that you don't want to make, you don't have to make them. Just read the advice and then discard what seems inappropriate.

When you role-play the reviewer, your goal is to help the writer. First, find out what the writer intended in the paper and then find out if the writer considers the draft to be near completion. Then offer advice. Give constructive, honest suggestions.

PLEASE CONTINUE . . .

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4.

First, decide who will play the part of the writer and who will play the part of the reviewer for each paper.

SAMPLE 1:

Which of you will pretend to be the other student-the writer?

Which of you will be the reviewer?

SAMPLE 2:

Which of you will pretend to be the other student-the writer?

Which of you will be the reviewer?

THE SIMULATED PEER REVIEW SESSION BEGINS BELOW.

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5. WRITER

After reading ''your'' paper carefully, answer the following questions:

1. What general impression of yourself were you trying to convey in your autobiographical statement?
2. What do you want the reviewer to help you with?
3. How far along in the drafting process do you feel you are?
4. What do you plan to do next?

WHEN YOU FINISH, YOU WILL NEED TO SWITCH COMPUTERS WITH YOUR PARTNER. FILL OUT THE REVIEW QUESTIONS IN THE NEXT SCREEN ON THE WRITER'S COMPUTER. THEN THE WRITER CAN SAVE THE RESPONSES.

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6. REVIEWER

You should be at the writer's (your partner's) computer for this part of the exercise. After you read the writer's responses to the above questions, read the writer's paper and answer the following questions.

1. What are some strengths of the paper?
2. Is there anything that the writer should delete?
3. Is there any information that the writer should add?
4. Are there any paragraphs that should be d'vided?
5. Do any paragraphs need tc be developed further?
6. Do any paragraphs need to be rearranged?
7. In addition to what the writer intends to do in order to complete the paper, what other suggestions do you have?
8. What responses do you have to the writer's specific requests for help (if any)?

WHEN YOU FINISH, RETURN TO YOUR OWN COMPUTER AND READ YOUR PARTNER'S COMMENTS ABOUT YOUR PAPER. THEN GET TOGETHER AND TALK ABOUT HOW YOU FELT DURING THIS EXERCISE SO THAT YOU CAN GET READY FOR PART TWO-THE REAL PEER REVIEW SESSION.

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7. PART TWO: PEER REVIEW OF CLASS ASSIGNMENT

In the above simulation, you had a chance to experience the roles of the writer and reviewer. Now you can use your developing abilities as reviewers to help one another with this week's assignment.

Remember, by trying to help one another you will gain insights into the process of creating effective writing. Since you are reviewing papers-in-process, you will have an opportunity to revise substantially before the final drafts are due.

The writer/reviewer questionnaires begin below.

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8. WRITER

First load your paper in the space below so that your reviewer can move between your paper and the review questions.

Paper:

Now answer the following questions about your paper:

1. What general impression of yourself were you trying to convey in your autobiographical statement?
2. What do you want the reviewer to help you with?
3. How far along in the drafting process do you feel you are?
4. What do you plan to do next?

WHEN YOU FINISH, YOU WILL NEED TO SWITCH COMPUTERS WITH YOUR PARTNER. FILL OUT THE REVIEW QUESTIONS IN THE NEXT SCREEN ON THE WRITER'S COMPUTER. THEN THE WRITER CAN SAVE THE RESPONSES.

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9. REVIEWER

First read the writer's responses to questions in screen #8 and then read the writer's draft. After you have finished with the draft, answer the following questions.

1. What are some strengths of the paper?
2. Is there anything that the writer should delete?
3. Is there any information that the writer should add?
4. Are there any paragraphs that should be divided?
5. Do any paragraphs need to be developed further?
6. Do any paragraphs need to be rearranged?
7. In addition to what the writer intends to do in order to complete the paper, what other suggestions do you have?
8. What responses do you have to the writer's specific requests for help (if any)?

WHEN YOU FINISH, RETURN TO YOUR OWN COMPUTER AND READ YOUR PARTNER'S COMMENTS ABOUT YOUR PAPER.

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10.

Talk with your partner about his or her suggestions. Clarify anything you don't understand. In the space below, write some notes to yourself about your revision plans.

My revision plans:

IF YOU HAVE TIME LEFT IN THE PERIOD, BEGIN REVISING YOUR OWN PAPER.

**********END**********

Editing

The following activity files are designed to give students practice with editing. Later, when students have mastered the types of editing, they can simply be reminded of the skills they have learned.

The purpose of the sentence variety exercise is to help students determine whether they have varied their syntax enough to make their sentences interesting to read.

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  1.                SENTENCE VARIETY

  Good writers vary their sentence structure so
  that they do not bore their readers. For
  example, if you are writing about yourself, you
  should not always begin your sentences with the
  word ''I.''

         MOVE TO THE NEXT FRAME TO CONTINUE.

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2.

You can vary your sentences in several ways. Suppose you had two sentences like these:

My teacher assigned some homework.
I had to do the homework tonight.

You could combine the sentences in several ways, such as:

I had to do the homework tonight since my teacher assigned it.

You could add a dependent or subordinate thought, such as:

Since my teacher never wanted us to go home empty-handed, she assigned some homework.

You could begin one or both sentences with a single word, such as:

Today, my teacher assigned some homework.
Tonight, I had to do some homework.

PLEASE MOVE TO THE NEXT FRAME TO CONTINUE.

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3.

Here is a simple computer technique to use to determine whether your sentences lack variety. Read the sample paragraph below, move your cursor to the end of each sentence, and press the RETURN key.

My father is a very interesting man. He works very hard. He is a gardener for the millionaire on the hill. He always tells me funny stories about how they live. Once, he told me about a ''coming out'' party they had. Everyone wore fancy clothes. But everyone drank so much that they spilled food on themselves and got grass stains on their clothes. My father found many champagne bottles on the grounds. They were still full.

Now, look at the first words in each sentence. Do they seem to be the same type of word? If so, the sentences need to be varied.

MOVE TO THE NEXT FRAME NOW.

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4.

Rewrite the paragraph above so that the sentences are more interesting. Start your rewrite here:

When you finish, SAVE your file, print it out, and put it in your learning log.

**********END**********

Research Skill Lesson Files

The following lesson file may only be appropriate for advanced students working on a research paper, but it does demonstrate how you can teach writing skills appropriate to research papers.

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  1.                    PARAPHRASING

  Often we read something worth including in our
  research paper, but we do not want to include it
  in our paper as a quotation.

  Perhaps we already have too many quotations, and
  our paper looks as though it is nothing more
  than a series of them linked with transitions.

  Or perhaps the quotation is written in language
  that is much too difficult for the average
  reader to understand.

     PLEASE MOVE TO THE NEXT FRAME TO CONTINUE.
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  2.

  If we do not want to quote, but we do want to
  give the author credit for the ideas, then we
  can PARAPHRASE.

  TO PARAPHRASE is to restate another person's
  ideas in our own words.

  Next, you will practice paraphrasing.

        MOVE TO THE NEXT FRAME TO CONTINUE.
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3.

Imagine that you found the following definition of "fantasy":

"... the text must oblige the reader to consider the world of the characters as a world of living persons and to hesitate between a natural and a supernatural explanation of the events described."

In your own words, write what you believe the author, Tzvetan Todorov, means:

MOVE TO THE NEXT FRAME WHEN YOU FINISH.

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4.

You may have paraphrased what Todorov wrote in many different ways. One way is to say, "Todorov argued that a reader of fantasy should consider the characters to be living persons, but that the reader should not be able to determine whether the events were natural or supernatural."

MOVE TO THE NEXT FRAME FOR MORE PRACTICE.

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5.

Try paraphrasing this quote from Louis Vax:

"The fantastic narrative generally describes men like ourselves, inhabiting the real world, suddenly confronted by the inexplicable."

Write your paraphrase here:

MOVE TO THE NEXT FRAME TO CONTINUE.

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  G.

  If you understand what is meant by paraphrasing
  and how to paraphrase, SAVE this exercise and
  what you have written, put it in your notebook,
  and do this assignment:

  Find five quotes, copy them, and paraphrase
  them. Insert them in your learning log to be
  checked by the teacher later.

              NOW, SAVE THIS ACTIVITY FILE.

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Whole-Process Lesson Files

If you want to provide on-line assistance to your students for each phase of the writing process, you might want to have the entire lesson in one file, as illustrated by this exercise. By building a collection of "whole-process" files, you can provide independent work for students who are ready for more work. Emphasize that students do not need to move through the exercise in a lockstep manner. If they read through the entire file before they begin working on it, they will grasp the general direction of the writing tasks. Then, as they write, they can move back and forth through the files, using the word processor flexibly, just as they would if they wrote without the file to guide them.

The following writing assignment leads students through a process for writing a letter of complaint. As a writing lesson, it is designed to help teach students techniques to use when they do their self-initiated writing with the word processor, without a structured lesson file. One key technique developed by this lesson involves generating ideas first, printing out a hard copy to read and contemplate, and then writing a draft. Later, the draft may be read by peers or the writer, revised on the spot, or submitted to the revising heuristic contained within the lesson.

****

1. THE LETTER OF COMPLAINT

Have you ever been mad about something that happened to you or felt cheated after paying for something? Did you feel mad enough to complain about it? Below, list some things that you experienced and that you wanted to or still want to complain about:

WHEN YOU FINISH YOUR LIST, CONTINUE TO THE NEXT FRAME.

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2.

Reread your list of things to complain about. Pick one that you would like to use as the subject of a letter of complaint. Below, tell why you want to complain about that experience:

WHEN YOU FINISH YOUR EXPLANATION, CONTINUE TO THE NEXT FRAME. REMEMBER, YOU CAN RETURN TO THIS FRAME TO REREAD AND REVISE YOUR LETTER WHENEVER YOU WANT.

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3. THE READER

Whom are you going to write to? Write that person's name, title (if you know it), and address here:

Why do you want to write to this person? How can this person help solve your problem?

WHEN YOUR RESPONSE IS COMPLETE, MOVE TO THE NEXT FRAME.

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4. BEGINNING YOUR LETTER

In your first paragraph, explain clearly what happened or what the problem is. Write your first paragraph here:

WHEN YOU FINISH, CONTINUE TO THE NEXT FRAME. RETURN TO THIS FRAME WHENEVER YOU WANT.

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5. THE EXPLANATION

Now explain how the problem or experience happened. Be sure that you explain clearly.

WHEN YOU FINISH, CONTINUE TO THE NEXT FRAME. RETURN TO THIS FRAME WHENEVER YOU WANT.

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6. SO WHAT?

At this point, a reader should know what the problem is and how the problem happened. But what do you want the reader to do about it? Write your proposed solution here:

REREAD AND REVISE YOUR RESPONSES TO THESE QUESTIONS, THEN SAVE YOUR FILE. PRINT A HARD COPY AND GIVE IT TO ANOTHER WRITER IN YOUR CLASS TO RESPOND TO. THE REVIEW QUESTIONS ARE IN THE NEXT FRAME.

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7. A READER'S RESPONSE TO YOUR IDEAS SO FAR

READER: Assume that you are the person being written to with the complaint. Answer the following questions, either on the hard copy or on the disk:

1. The beginning:
   A. Do you understand what the complaint or problem is?
   B. How do you feel after the first paragraph?
      sympathetic
      insulted
      hurt
   C. Why do you feel that way?
2. The explanation:
   A. Is the explanation complete, or do you want more information? If so, what information could you use?
   B. Do you understand the explanation, or are you confused? If you are confused, what is confusing you?
3. The request:
   A. In your own words, tell what the writer wants you to do.
   B. If you really were the intended reader, would you grant the writer's request? Why or why not?

WHEN YOU FINISH, SAVE YOUR ANSWERS AND GIVE THEM TO THE WRITER.

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8.

WRITER: Reread your fellow writer's responses to your draft. Go back to the letter, read it, and make any changes you want to so that the reader responds in the way you want. Then, using your block moves, move your draft here:

Now, add those elements that make it a good business letter:

THE DATE
THE INSIDE ADDRESS
THE GREETING
THE CLOSING

WHEN YOUR LETTER LOOKS OFFICIAL, MOVE TO THE NEXT FRAME.

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9. ONE MORE TIME

This time, you reread your letter as though you were the reader. Do you think your reader understands the problem and how it occurred? Do you think your reader will know exactly what you want to happen?

Below, write a rough draft of the response letter that you think your intended reader will write to you:

WHEN YOU FINISH, MOVE TO THE NEXT FRAME.

****

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10.

Reread the letter you just wrote to yourself and your original letter. If you believe your letter of complaint will accomplish its purpose, SAVE it and move to the next frame. If you think your letter could still be improved, work on it now.

WHEN YOU FINISH, MOVE TO THE NEXT FRAME.

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11. PROOFREADING

Reread your letter to make sure that:

1. the format is good business style
2. the spelling is correct
3. the punctuation is correct
4. the usage is correct.

Correct whatever you need to so that the letter may be mailed.

WHEN YOU FINISH, PRINT A FINAL DRAFT
OF YOUR LETTER OF COMPLAINT.

**********END OF FILE**********

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